

## CLAIMS

1. An inspecting circuit of a semiconductor device characterized by comprising:

5 a plurality of input terminal which is inputted with signals from a plurality of signal lines respectively; and

two output terminals at which an output of inspection can be obtained,

wherein a determination whether the semiconductor device is normally operated or not is performed by two signals obtained at the two output terminals.

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2. The inspecting circuit of a semiconductor device according to claim 1, characterized by comprising:

a plurality of NANDs;

a plurality of NORs; and

15 a plurality of inverters,

wherein an output terminal of a NAND of i-th line (i is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of (i + 1)th line through the inverter;

20 wherein an output terminal of a NOR of i-th line (i is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of (i + 1)th line through the inverter;

wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

25 wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained; and

30 wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained.

3. The inspecting circuit of a semiconductor device according to claim 1, characterized by comprising:

a plurality of NANDs;  
5 a plurality of NORs;  
a plurality of inverters; and  
a comparator circuit,

wherein an output terminal of a NAND of i-th line (i is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input  
10 terminal of a NAND of (i + 1)th line through the inverter;

wherein an output terminal of a NOR of i-th line (i is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of (i + 1)th line through the inverter;

wherein the plurality of input terminals are electrically connected to second  
15 input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained;

20 wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained; and

wherein an output terminal of the comparator circuit is electrically connected to an output terminal at which an output of an inspection is obtained.

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4. The inspecting circuit of a semiconductor device according to claim 3, characterized in that an ExNOR is used for the comparator circuit.

5. An inspecting circuit of a semiconductor device characterized by  
30 comprising;

an inspecting circuit having a plurality of signal output lines,  
wherein the inspecting circuit comprises a plurality of input terminals to  
which signals from a plurality of signal output lines are inputted, and an output  
terminal at which an output of an inspection is obtained; and  
5 a determination whether the semiconductor device is normally operated or  
not is performed by comparing an output pattern obtained at the output terminal by a  
signal inputted to the plurality of input terminals and a reference pattern.

6. The inspecting circuit of a semiconductor device according to claim 5,  
10 characterized by comprising:

a plurality of NANDs;  
a plurality of NORs; and  
a plurality of inverters,

wherein an output terminal of a NAND of i-th line (i is an integer number  
15 of two or more) in the plurality of NANDs is electrically connected to a first input  
terminal of a NAND of (i + 1)th line through the inverter;

wherein an output terminal of a NOR of i-th line (i is an integer number of  
two or more) in the plurality of NORs is electrically connected to a first input terminal  
of a NOR of (i + 1)th line through the inverter;

20 wherein the plurality of input terminals are electrically connected to second  
input terminals of the plurality of NANDs and second input terminals of the plurality  
of NORs respectively;

wherein an output terminal of a NAND of a final line in the plurality of  
NANDs is electrically connected to an output terminal at which a first output of an  
25 inspection is obtained; and

wherein an output terminal of a NOR of a final line in the plurality of NORs  
is electrically connected to an output terminal at which a second output of an  
inspection is obtained.

30 7. The inspecting circuit of a semiconductor device according to claim 5,

characterized by comprising:

- a plurality of NANDs;
- a plurality of NORs;
- a plurality of inverters; and
- 5 a comparator circuit,

wherein an output terminal of a NAND of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of  $(i + 1)$ th line through the inverter;

- 10 wherein an output terminal of a NOR of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of  $(i + 1)$ th line through the inverter;

wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

- 15 wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained;

- wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained; and
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wherein an output terminal of the comparator circuit is electrically connected to an output terminal at which an output of an inspection is obtained.

- 8. The inspecting circuit of a semiconductor device according to claim 7,
- 25 characterized in that an ExNOR is used for the comparator circuit.

9. An inspecting circuit of a semiconductor device characterized by comprising:

- an inspecting circuit having a source driver which inputs a clock signal, a
- 30 start pulse and a video signal and outputs a signal to a plurality of source signal lines in

accordance with the clock signal, the start pulse and the video signal,

wherein the inspecting circuit comprises a plurality of input terminals to which signals outputted to the plurality of source signals are inputted respectively, and an output terminal at which an output of an inspection is obtained; and

5            wherein a determination whether the semiconductor device is normally operated or not is performed by comparing an output pattern obtained by a signal inputted to the plurality of input terminals and a reference pattern.

10           10. The inspecting circuit of a semiconductor device according to claim 9, characterized by comprising:

a plurality of NANDs;

a plurality of NORs; and

a plurality of inverters,

15           wherein an output terminal of a NAND of i-th line (i is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of (i + 1)th line through the inverter;

wherein an output terminal of a NOR of i-th line (i is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of (i + 1)th line through the inverter;

20           wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

25           wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained; and

wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained.

30           11. The inspecting circuit of a semiconductor device according to claim 9,

characterized by comprising:

a plurality of NANDs;  
a plurality of NORs;  
a plurality of inverters; and  
5 a comparator circuit,

wherein an output terminal of an NAND of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of  $(i + 1)$ th line through the inverter;

10 wherein an output terminal of a NOR of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of  $(i + 1)$ th line through the inverter;

wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

15 wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained;

20 wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained; and

wherein an output terminal of the comparator circuit is electrically connected to an output terminal at which an output of an inspection is obtained.

25 12. The inspecting circuit of a semiconductor device according to claim 11, characterized in that an ExNOR is used for the comparator circuit.

13. An inspecting circuit of a semiconductor device, characterized by comprising:

30 an inspecting circuit having a gate driver which inputs a clock signal and a start pulse and sequentially outputs a select pulse to a plurality of source signal lines in

accordance with the clock signal and the start pulse,

wherein the inspecting circuit comprises a plurality of latch circuits which sample a signal for inspection in accordance with the select pulse which is outputted sequentially to the plurality of gate lines; and

5 a plurality of input terminals to which output signals from the plurality of latch circuits are inputted, and an output terminal at which an output of an inspection is obtained; and

wherein a determination whether the semiconductor device is normally operated or not is performed by comparing an output pattern obtained at the output  
10 terminal by a signal inputted to the plurality of input terminals and a reference pattern.

14. The inspecting circuit of a semiconductor device according to claim 13, characterized by comprising:

a plurality of NANDs;  
15 a plurality of NORs; and  
a plurality of inverters,

wherein an output terminal of a NAND of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of  $(i + 1)$ th line through the inverter;

20 wherein an output terminal of a NOR of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of  $(i + 1)$ th line through the inverter;

wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality  
25 of NORs respectively;

wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained; and

wherein an output terminal of a NOR of a final line in the plurality of NORs  
30 is electrically connected to an output terminal at which a second output of an

inspection is obtained.

15. The inspecting circuit of a semiconductor device according to claim 13, characterized by comprising:

- 5           a plurality of NANDs;  
          a plurality of NORs;  
          a plurality of inverters; and  
          a comparator circuit,

          wherein an output terminal of an NAND of  $i$ -th line ( $i$  is an integer number  
10 of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of  $(i + 1)$ th line through the inverter;

          wherein an output terminal of a NOR of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NORs is electrically connected to a first input terminal of a NOR of  $(i + 1)$ th line through the inverter;

15           wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

          wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an  
20 inspection is obtained;

          wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained; and

          wherein an output terminal of the comparator circuit is electrically  
25 connected to an output terminal at which an output of an inspection is obtained.

16. The inspecting circuit of a semiconductor device according to claim 15, characterized in that an ExNOR is used for the comparator circuit.

30           17. An inspecting circuit of a semiconductor device characterized by



comprising a plurality of NANDs, a plurality of NORs, and a plurality of inverters,

wherein an output terminal of a NAND of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of  $(i + 1)$ th line through the inverter;

5 wherein an output terminal a NOR of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality or NORs is electrically connected to a first input terminal of a NOR of  $(i + 1)$ th line through the inverter;

wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

10 wherein an output terminal of a NAND of a final line in the plurality of NANDs is electrically connected to an output terminal at which a first output of an inspection is obtained; and

wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to an output terminal at which a second output of an inspection is obtained.

18. An inspecting circuit of a semiconductor device characterized by comprising a plurality of NANDs, a plurality of NORs, a plurality of inverters, and a comparator circuit,

20 wherein an output terminal of a NAND of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality of NANDs is electrically connected to a first input terminal of a NAND of  $(i + 1)$ th line through the inverter;

25 wherein an output terminal a NOR of  $i$ -th line ( $i$  is an integer number of two or more) in the plurality or NORs is electrically connected to a first input terminal of a NOR of  $(i + 1)$ th line through the inverter;

wherein the plurality of input terminals are electrically connected to second input terminals of the plurality of NANDs and second input terminals of the plurality of NORs respectively;

30 wherein an output terminal of a NAND of a final line in the plurality of

NANDs is electrically connected to a first input terminal of the comparator circuit;

wherein an output terminal of a NOR of a final line in the plurality of NORs is electrically connected to a second input terminal of the comparator circuit; and

wherein an output terminal of the comparator circuit is electrically  
5 connected to an output terminal at which an output of an inspection is obtained.

19. The inspecting circuit of a semiconductor device according to claim 18,  
characterized in that an ExNOR is used for the comparator circuit.

10 20. An inspecting method of a semiconductor device characterized by  
comprising the steps of:

inputting signals outputted to all of a plurality of output signal lines to an  
inspecting circuit simultaneously;

obtaining an output pattern from the inspecting circuit; and

15 determining an operation of the semiconductor device to be good or  
defective by comparing the output pattern and a reference pattern.

21. An inspecting method of a semiconductor device, characterized by  
comprising the steps of:

20 sampling signals for inspection sequentially in accordance with signals  
outputted sequentially from a plurality of output signal lines;

inputting all of the sampled signals for inspection to an inspecting circuit  
simultaneously;

obtaining an output pattern from the inspecting circuit; and

25 determining an operation of the semiconductor device to be good or  
defective by comparing the output pattern and a reference pattern.